Using the 8-port TokenSpeed and TokenSpeed/MCP Switch Modules

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Bay Networks

Bay Networks

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Preface

Congratulations on your purchase of the Bay Networks® 8-port TokenSpeed™ or TokenSpeed/MCP switch module. The TokenSpeed and TokenSpeed/MCP switch modules provide token ring connectivity for the Centillion 100™ and Centillion 50™ switches. In addition, a TokenSpeed/MCP module can provide the master control processing functions for a Centillion™ switch.

In this guide, the TokenSpeed module and TokenSpeed/MCP module are referred to collectively as the TokenSpeed module. Each model is referred to specifically when features and functions are unique to that particular model.

Purpose

This guide provides information about installing and using the TokenSpeed module. Configuration of the TokenSpeed module is covered in *Using SpeedView 2.1 for Windows*. For more information about these guides, see "Related Publications" on page xv.

Audience

This guide is intended for local area network administrators with the following background:

- Familiarity with token ring network administration
- SpeedView for Windows: working knowledge of Windows
- SpeedView for UNIX: working knowledge of UNIX

Conventions

This section describes the conventions used in this guide.

Special Message Formats

This guide uses the following formats to highlight special messages:

Note: This format is used to highlight information of importance or special interest.

Caution: This format is used to highlight information that will help you prevent equipment failure or loss of data.

Warning: This format is used to highlight material involving possibility of injury or equipment damage.

Two-tiered Procedure Format

The procedural steps in this guide are presented in a two-tiered format. The first tier describes the step briefly but precisely. An experienced user may need to read only the first tier to complete the task. The second tier describes the step in more detail and may include results of performing the step.

Related Publications

For more information about using the TokenSpeed module, refer to the publications listed in Table 1.

Table 1. Related publications

Title	Description
Installation and Reference for the Centillion Chassis (Bay Networks part number 893-894-A)	Describes installation procedures for the Centillion chassis.
Using SpeedView 2.1 for Windows (Bay Networks part number 893-891-B)	Describes the software configuration features for the Centillion switch and modules from a Windows platform.
Reference Guide for the Centillion 100 and Model 5000BH Switches (Bay Networks part number 893-01006-A)	Provides reference information about switching terminology and concepts; describes configuration examples using Centillion 100 and Model 5000BH switches.
Reference Guide for the Centillion Command Line Interface (Bay Networks part number 893-00985-A)	Describes setup and configuration procedures for Centillion switches using the command line interface.
Using the Centillion 50 Token Ring Workgroup Switch (Bay Networks part number 893-01015-A)	Describes typical network uses and installation procedures for the Centillion 50T switch.

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Valbonne, France	33-4-92-96-69-68	33-4-92-96-69-98
Sydney, Australia	61-2-9927-8800	61-2-9927-8811
Tokyo, Japan	81-3-5402-0180	81-3-5402-0173

Use Express Routing Code 145 to reach a support representative for token ring switching products.

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Chapter 1
Overview of the TokenSpeed Module

This chapter introduces the 8-port TokenSpeed module and covers the following topics:

- A summary of module functions, capabilities, and features (starting on this page)
- A physical description of the module printed circuit board and the board in relation to the Centillion switch chassis (see page 1-4)

About the TokenSpeed Module

The 8-port TokenSpeed module inserts into one slot of a Centillion 100 or Centillion 50 switch chassis to provide token ring ports and, optionally, an integrated master control processor (MCP). This module replaces earlier module versions that provided only four ports. The TokenSpeed module comes in the following configurations:

- A TokenSpeed module with eight switched token ring ports with RJ-45 connectors for unshielded twisted pair (UTP) or shielded twisted pair (STP) cable
- A TokenSpeed/MCP module with eight switched token ring ports with RJ-45 connectors for UTP/STP cable and a serial port implemented on a Mini DIN 8 connector

These modules offer identical functional features for token ring connectivity. In addition to providing token ring connectivity, a TokenSpeed/MCP module also manages the Centillion switch. The MCP port can be used to connect a network management station. One (and only one) MCP module is required for each Centillion chassis; however, an ATMSpeed/MCP or EtherSpeed/MCP module can also be used to meet this requirement.

Features

This section provides a summary of the features of the TokenSpeed module, including the following topics:

- TokenSpeed module ports and connectivity
- Filtering
- Caching and proxy
- Fault tolerance
- Network management

TokenSpeed Module Ports and Connectivity

TokenSpeed module ports have the following features:

- Operation at 4 or 16 megabits per second (Mb/s), with automatic sensing of the data rate of an inserting station
- Onboard connectors
  - — RJ-45 connector for UTP/STP connection to each token ring port
  - — One serial port with a Mini DIN 8 connector on the TokenSpeed/MCP module
- Transparent, source route, and source route transparent bridging with IEEE 802.1d or IBM Spanning Tree support
- Virtual ring partitioning for any combination of ports in a single switch, each virtual ring appearing as a single ring in a source-routing network
- Per-port features
  - — LEDs to indicate operational status of each port
  - — Automatic adaptation to speed of inserting station: 4 or 16 Mb/s
  - — Automatic port deactivation for errors or administrative control
  - — Wire-speed port-to-port switching for local traffic without using any ATM backplane bandwidth

Filtering

The TokenSpeed module has the following filtering features:

- Support for NetBIOS name filters, datagram broadcast filters, and a name query interval
- Filtering for any pattern up to 12 bytes wide in the first 255 bytes of a frame
- Per-port filter configuration

Caching and Proxy

The TokenSpeed module has the following caching and proxy features:

- Caching for NetBIOS names to reduce NetBIOS name broadcast packets (Each switch can cache up to 500 NetBIOS names.)
- Caching for Route Information Field (RIF) to speed up the explorer process and reduce broadcasts (Each switch can cache up to 500 unique RIFs.)
- Cache capacity of up to 128 RIFs for source route explorer proxy and 5120 media access control (MAC) addresses
- Cache capacity of up to 10,240 MAC addresses in the MCP station table

Fault Tolerance

The TokenSpeed module has the following fault-tolerance features:

- Ability to install, remove, and replace a module in an operational chassis (hot-swap)
- Flash memory download with storage for two configurations on the TokenSpeed/MCP module
- Software update and management access over the network or a serial connection to the TokenSpeed/MCP module

Network Management

The TokenSpeed/MCP module provides the following network management features for the TokenSpeed module and other modules in a Centillion switch:

- Simple Network Management Protocol (SNMP) agent with Centillion Management Information Base (MIB) extensions

- Bootstrap Protocol (BootP) and Trivial File Transfer Protocol (TFTP) support
- SpeedView™ application for configuration management and monitoring, available for Windows environments over RS-232 and SNMP

For additional information about SpeedView, refer to *Using SpeedView 2.1 for Windows*.

Physical Description

The TokenSpeed module (see Figure 1-1) is an assembly that consists of a printed circuit board with a metal module faceplate. The module has inserter/extractor levers and captive retaining screws on each side of the front panel. The module occupies a single slot in the Centillion switch chassis.

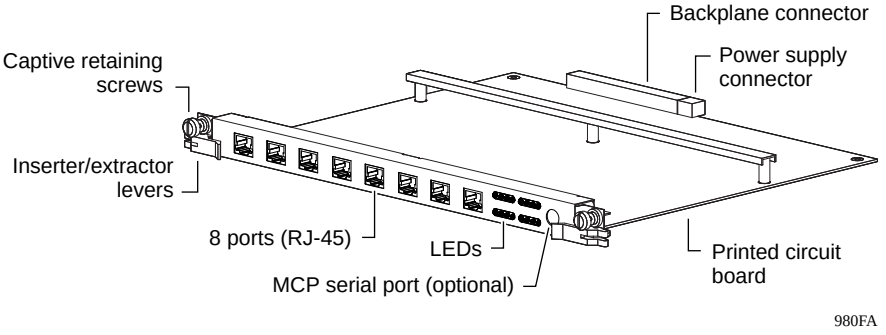


Figure 1-1. Hardware features of the TokenSpeed module

The module front panel contains eight RJ-45 connectors for the token ring ports and an array of port LEDs that indicate ring insertion and port activity. The TokenSpeed/MCP module also has a Mini DIN 8 connector for the serial MCP port.

For descriptions of the LEDs, see "TokenSpeed Module LEDs" on page 3-8. For cable and connector specifications, see Appendix B, "Cables".

Chapter 2
TokenSpeed Module Applications

This chapter provides information about typical uses of the TokenSpeed module to improve network performance. The chapter includes information about the following uses:

- Giving a server a dedicated port (see this page)
- Segmenting a ring (see page 2-2)
- Replacing a source route bridge or router (see page 2-5)
- Concentrating rings into a router (see page 2-5)

Giving a Server a Dedicated Port

You can improve server response and increase throughput capacity by giving a server a dedicated port on the TokenSpeed module.

Note: Giving a server a dedicated port on the TokenSpeed module need not increase the source route hop count. You can maintain or even decrease the source route hop count by assigning the server to the same virtual ring as its communicating stations (refer to *Using SpeedView 2.1 for Windows*.)

Figure 2-1 shows a network with a server connected to the network, first through a shared-media hub and then through a TokenSpeed module in a Centillion 50 Token Ring Workgroup Switch.

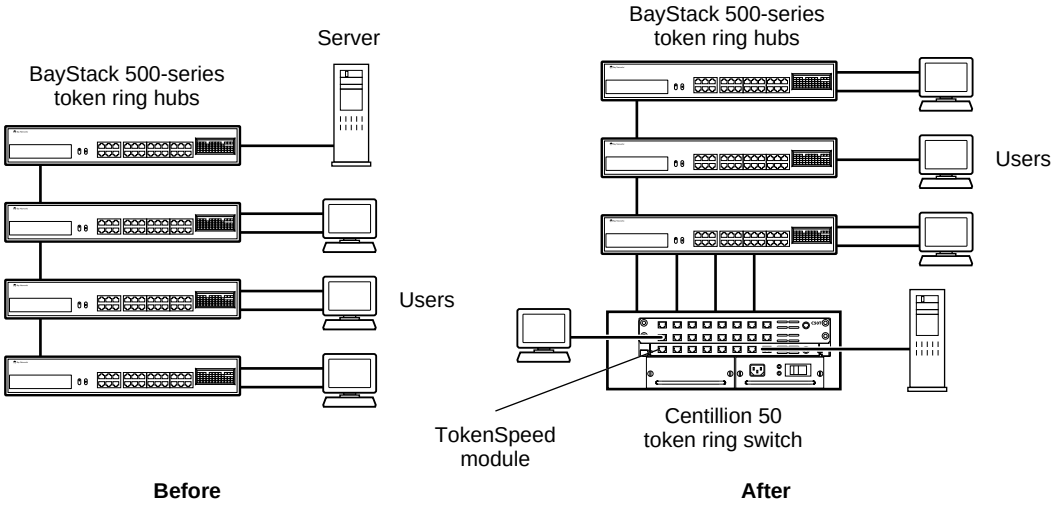


Figure 2-1. Giving a server a dedicated port

Segmenting a Ring

You can segment rings and connect the ring segments to the TokenSpeed module using either Ring In/Ring Out (RI/RO) ports or lobe ports on the token ring hubs.

Note: If you connect a token ring hub to a switch using only the RI or RO port, you have no backup path between the switch and the hub.

Connecting a Segment Through the RI or RO Port

Figure 2-2 shows a network with IBM 8228-style media attachment units (MAUs) forming a single ring segment. You can create two ring segments by connecting one MAU to a TokenSpeed module through the RI or RO port on the MAU. The remaining MAUs form a segment that is connected to the TokenSpeed module through a lobe port on the MAU.

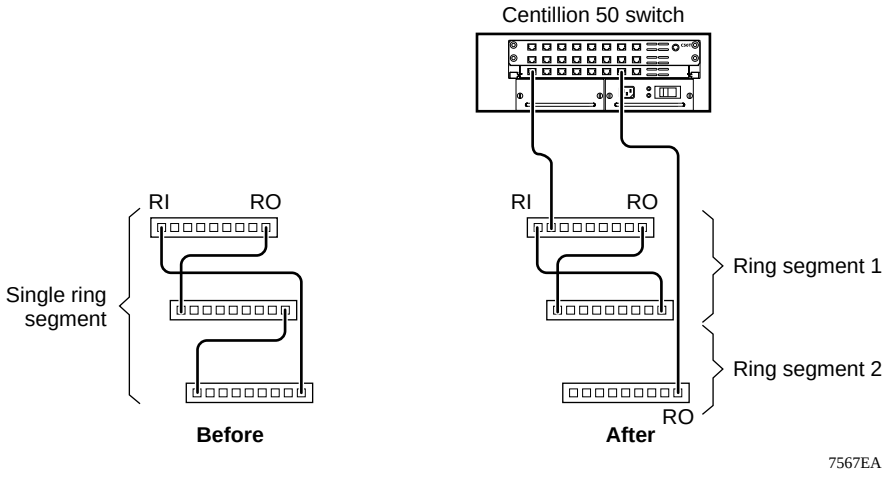


Figure 2-2. Connecting a ring segment through an RI/RO port (ring segment 2)

Connecting a Segment Using a Lobe Port

Figure 2-3 shows a network with three stacked token ring hubs forming a single ring segment. Each hub can be connected through a lobe port to a TokenSpeed module to create three ring segments.

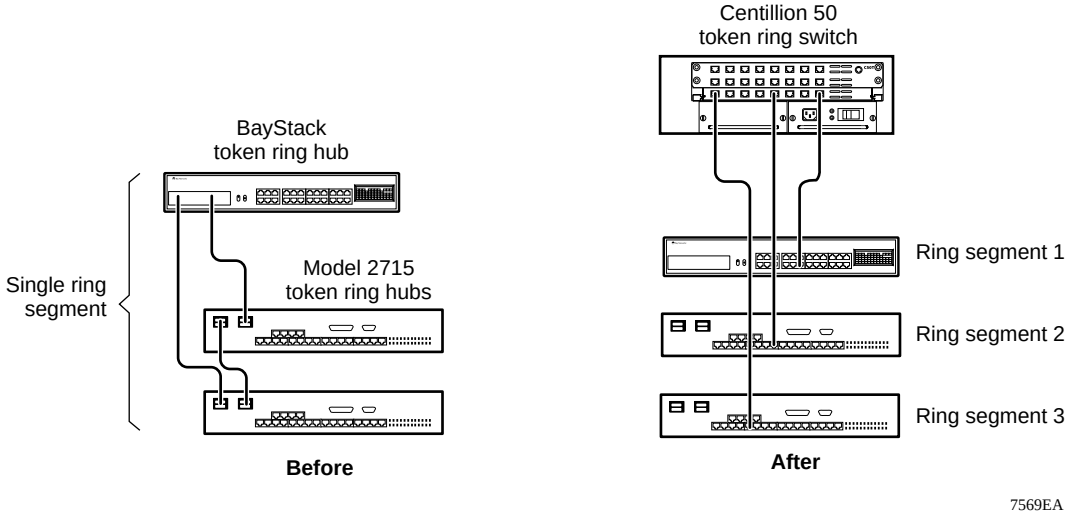


Figure 2-3. Connecting ring segments through lobe ports

Replacing a Source Route Bridge or Router

Figure 2-4 shows a network in which a Centillion switch replaces three source route bridges.

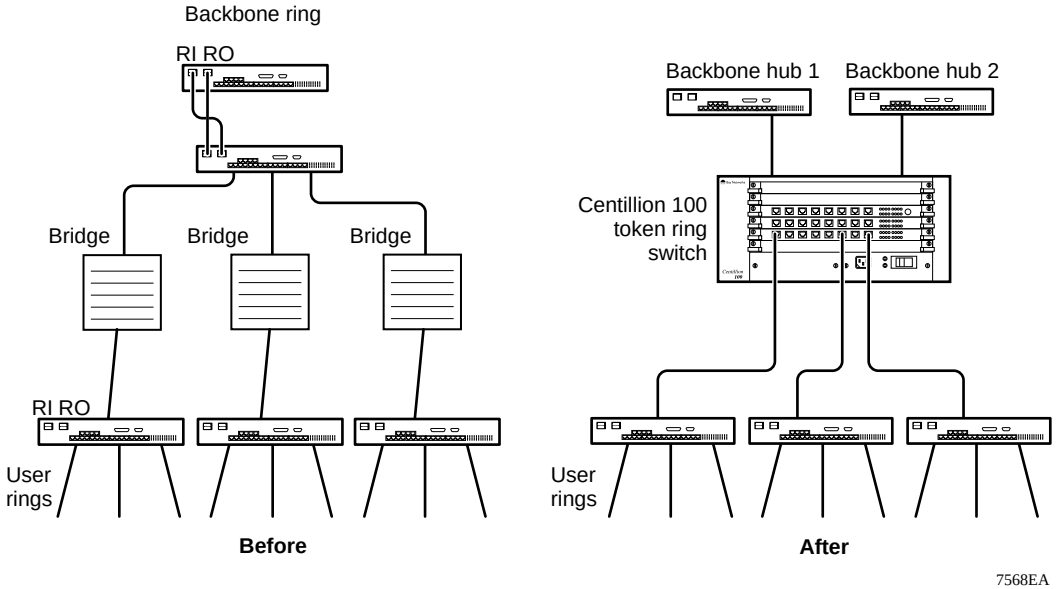


Figure 2-4. Replacing a source route bridge or router

Concentrating Rings into a Router

To concentrate rings into a router, make sure virtual rings in the network are set up in one of the following two ways:

- To segment a congested ring without using new router ports, be sure that all stations previously connected to a single router port are in the same virtual ring (refer to *Using SpeedView 2.1 for Windows*). The router will continue to view the network the same way it did before the rings were segmented.
- To concentrate multiple, small ring segments into a router subnet and to free router ports, be sure all segments are in the same virtual ring so that you can group the entire virtual ring into a single router port. Be sure that the number of devices in the virtual ring does not exceed the subnet size defined on the router.

Figure 2-5 shows a network where each ring segment uses a separate router port. By using a TokenSpeed module in a Centillion switch, you can concentrate many physical ring segments into a few logical rings that use fewer router ports.

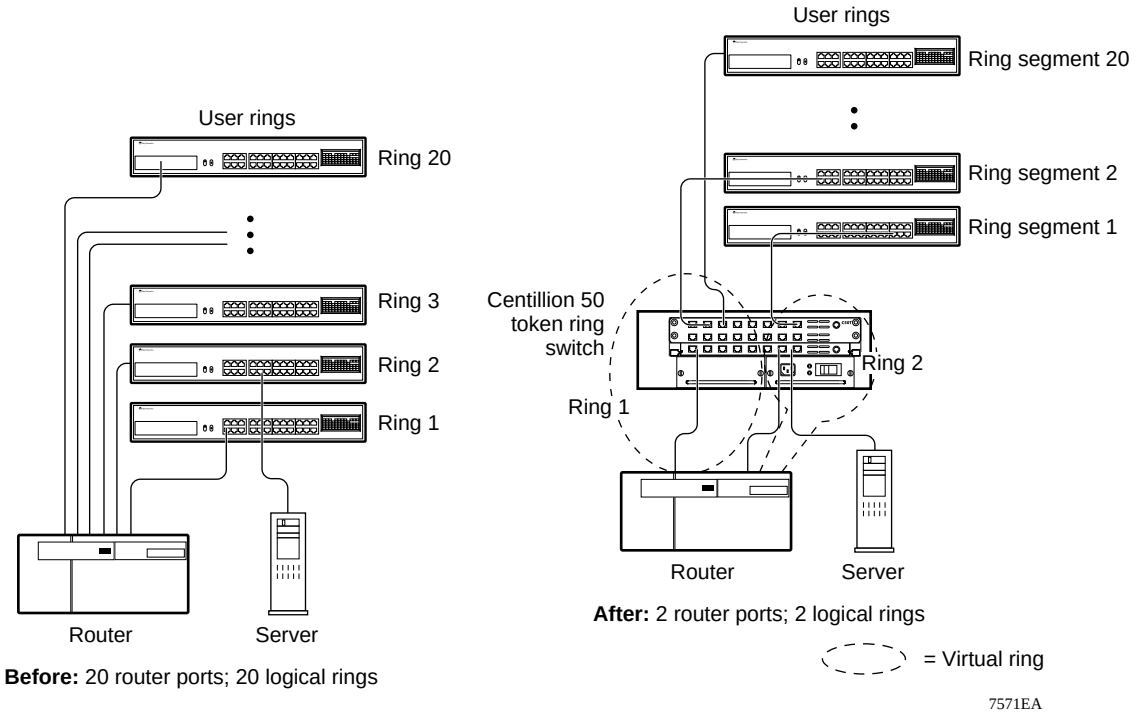


Figure 2-5. Concentrating multiple rings into a router

Chapter 3
Installing and Connecting the TokenSpeed Module

This chapter explains how to install and connect a TokenSpeed module and includes the following information and procedures:

- Preparing for installation (see this page)
- Installing the TokenSpeed module (see page 3-2)
- Connecting cables to TokenSpeed module ports (see page 3-5)
- Verifying the installation (see page 3-7)
- Configuring the TokenSpeed module (see page 3-9)
- Removing and replacing a module (see page 3-11)

Preparing for Installation

Before you install the TokenSpeed module, make sure that the Centillion switch chassis is assembled and ready to accept modules. For more information, refer to the installation instructions that were shipped with your switch chassis.

You need the following tools and materials to install the module:

- Medium flat-tip screwdriver for the captive retaining screws
- Grounded antistatic mat and wrist strap

Caution: Centillion modules use electronic components that are sensitive to static electricity. Static discharge from your clothing or other items around you, even at levels that do not create a spark, can cause damage. Take all possible precautions to prevent static discharge damage when working with printed circuit boards.

Keep each board in its protective conductive bag until you are ready to install it. If possible, place all printed circuit boards on an antistatic mat and wear a grounded antistatic wrist strap and leash to free yourself of static.

If you lack a grounded antistatic wrist strap and mat, be careful to stand in one place where you work (so you do not generate static electricity by friction) and to free yourself of static by touching the metal of a grounded chassis before handling a printed circuit board.

Installing the TokenSpeed Module

You can insert or remove a TokenSpeed module from a switch chassis while the power is on without interrupting service in the other installed modules. This ability is referred to as "hot swapping."

Note: A TokenSpeed module can be hot inserted into a switch chassis at any time. However, before removing an active module from a switch chassis, you must deactivate the module by either unplugging all port cables or disabling all ports on the module. For additional information, see "Removing and Replacing a Module" on page 3-11.

To install and secure the module in the chassis, follow these steps:

1. **Remove the filler panel.**
    a. **Loosen the two captive retaining screws on a filler panel until they pop free of the chassis frame.**

b. **Rotate the left and right inserter/extractor levers away from the center of the filler panel to release the filler panel from the chassis frame, and lift the filler panel away from the switch (see Figure 3-1).**

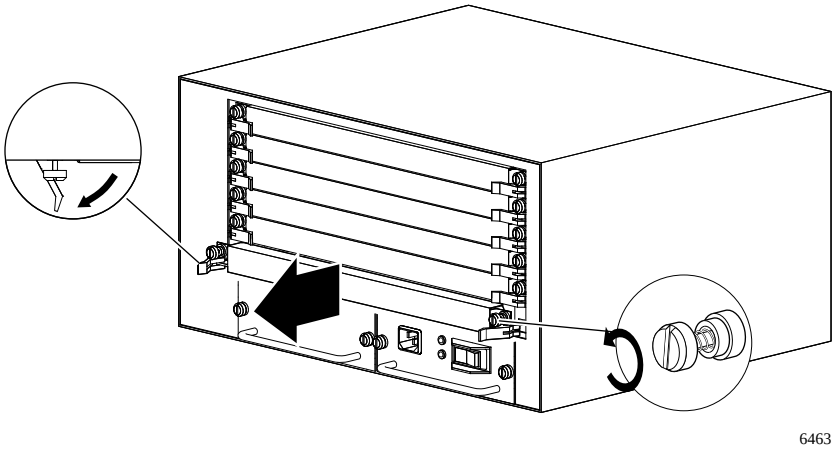


Figure 3-1. Removing a filler panel

2. **Make sure the module inserter/extractor levers are extending forward (see Figure 3-2).**

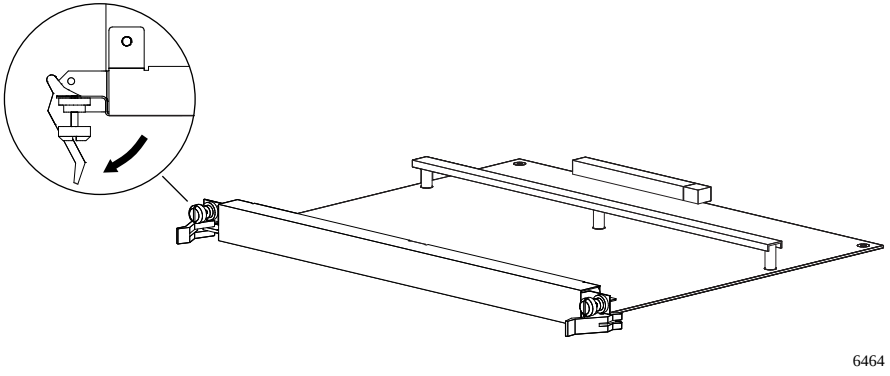


Figure 3-2. Inserter/extractor levers ready for installation

3. **Align the left and right edges of the module in the guides on each side of the slot (see Figure 3-3).**

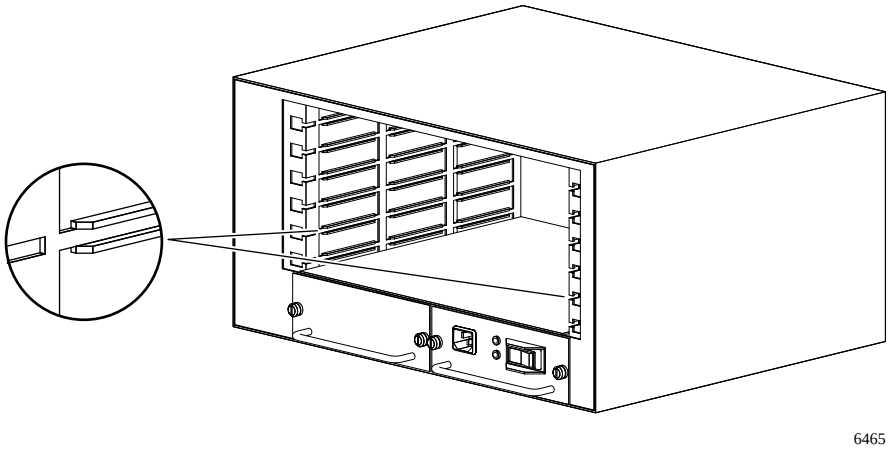


Figure 3-3. Slot module guides

4. **Slide the module into the chassis until you feel it touch the backplane (see Figure 3-4).**

   The inserter/extractor levers should still be extended forward and in contact with the front of the chassis. *Do not* push the module all the way into the chassis.

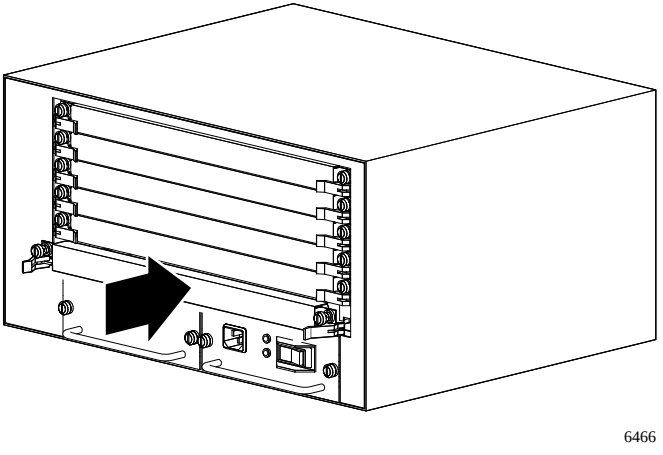


Figure 3-4. Inserting the module into the chassis

5. **To seat the module against the backplane, rotate the inserter/extractor levers inward toward each other (see Figure 3-5).**

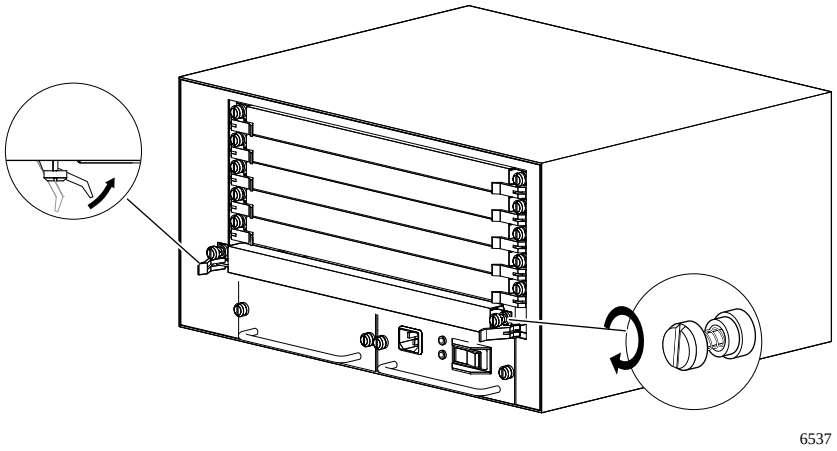


Figure 3-5. Seating the module

When the front panel of the module is flush with the front of the chassis, the module backplane connectors are properly seated.

6. **Align and tighten the captive retaining screw at each end of the module front panel (see Figure 3-5).**

Connecting Cables to TokenSpeed Ports

This section describes how to connect cables to the ports on a TokenSpeed module with the following connections:

- Token ring connections to the RJ-45 ports
- Management connection to the MCP port

Token Ring Connections

When you connect a network device to a token ring port on the TokenSpeed module, you must specify a TokenSpeed port type using SpeedView. The port type setting is based on the type of network connection you are connecting to the TokenSpeed module. Table 3-1 shows the types of network connections and the correct port type for each.

Table 3-1. Port types for the TokenSpeed module

Network device port	TokenSpeed port type
Lobe port on token ring hub	Station
Lobe port on IBM 8228 MAU or similar device	Station
Station port on a network interface card (NIC) in a server, PC, or router	Hub
RI port on a Bay Networks token ring hub	Bay/SNPX RO
RO port on a Bay Networks token ring hub	RI–other **Note:** The RO port type on the Bay Networks hub must be set as Other.
RI port on a non-Bay Networks token ring hub	RO–other
RO port on a non-Bay Networks token ring hub	RI–other

To make the connection, use a straight-through cable with an RJ-45 connector on one end (see Figure 3-6) and an appropriate connector for the network device on the other end. For cable specifications and connector pin assignments, see Appendix B, "Cables."

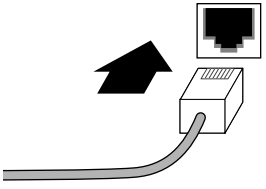


Figure 3-6. Connecting a cable to an RJ-45 port on the TokenSpeed module

Management Connection

A serial connection for a SpeedView network management station is provided on the TokenSpeed/MCP module. The cable for this connection is shipped with the Centillion switch. Attach the serial MCP cable to the Mini DIN 8 port on the TokenSpeed/MCP module (see Figure 3-7).

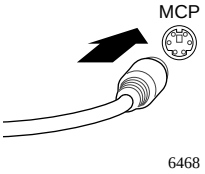


Figure 3-7. Connecting the serial MCP cable to the TokenSpeed/MCP

Attach the other side of the MCP cable to the serial port of your management station, either directly or through the DB-25 to DB-9 adapter that is also shipped with the switch.

Verifying the Installation

When the TokenSpeed module is installed and the cables are connected to the ports, the module is ready for operation. All connected ports are enabled, unless they have been disabled by SpeedView. Enabling and disabling TokenSpeed module ports is described in *Using SpeedView 2.1 for Windows*.

You can verify the installation of a TokenSpeed module by looking at the LEDs on the module while the module is operating and during the system startup sequence. This section describes the TokenSpeed module LEDs and the LED sequence that occurs when the module starts.

TokenSpeed Module LEDs

The TokenSpeed module has status LEDs to indicate operating conditions for each port (see Figure 3-8).

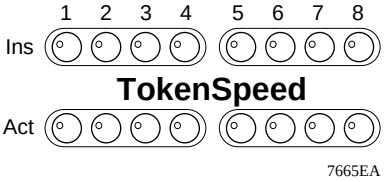


Figure 3-8. TokenSpeed module LEDs

Table 3-2 lists the meaning of each LED on the TokenSpeed module.

Table 3-2. TokenSpeed module LEDs

LED name	Meaning
Ins (inserted)	The Inserted LEDs on all ports flash simultaneously until any port on the module is successfully inserted. Once the first port is inserted, all Inserted LEDs reflect the state of the corresponding port: inserted into or deinserted from the ring.
Act (activity)	Lights when a packet is transmitted or received by the port.

LED Switch Startup Sequence

When the TokenSpeed module starts, all LEDs light for 2 or 3 seconds. Then the LEDs for ports 1 and 2 light in a sequence that is specific to the module type.

On the TokenSpeed/MCP, the following sequence occurs:

- Port 1:
  - — Act (activity) LED lights during switch memory test.
  - — Ins (inserted) LED lights during management bus test.

- Port 2:
  - — Act LED lights when software is loaded from flash memory.
  - — Ins LED lights when software loading is complete and the system begins executing.
- All LEDs turn off when the module has started up successfully.
- Ins LEDs on all ports toggle on and off, until the first port inserts successfully.

On the TokenSpeed module, the following sequence occurs:

- Port 1:
  - — Act (activity) LED lights during switch memory test.
  - — Ins (inserted) LED lights during management bus test.
- Port 2:
  - — Act LED lights while the module waits for software download from the MCP.
- All LEDs turn off when the module has started up successfully.
- Ins LEDs on all ports toggle on and off until the first port inserts successfully.

Configuring the TokenSpeed Module

The TokenSpeed module is shipped preconfigured with the configuration settings listed in Table 3-3. If transparent switching and no spanning tree operation are appropriate for your network, no further configuration is necessary.

Table 3-3. Factory default configuration settings

Parameter	Factory default	Possible settings
Switching mode	Transparent	Transparent, Source Route, Source Route Transparent
Spanning Tree Protocol	None	None, IEEE, IBM
State	Enabled	Enabled, Disabled
Port type	Station	Station, Hub, Bay/SNPX RO, RI–other, RO–other
Ring speed	16 Mb/s	16, 4, Auto
Speed sense	Disabled	Disabled, Enabled

Table 3-3. Factory default configuration settings (continued)

Parameter	Factory default	Possible settings
Filters	Disabled	Disabled, Enabled
Note: Do not enable both NetBIOS filtering and packet filtering on the same port. When both types of filtering are enabled, only the NetBIOS filtering is active.		
Bridge group	1	1–32
Virtual ring number (Valid only when source route bridging is selected.)	For ports 1 through 8 on each slot in hexadecimal format: Slot 1: 11, 12, 13, 14, 15, 16, 17, 18 Slot 2: 21, 22, 23, 24, 25, 26, 27, 28 Slot 3: 31, 32, 33, 34, 35, 36, 37, 38 Slot 4: 41, 42, 43, 44, 45, 46, 47, 48 Slot 5: 51, 52, 53, 54, 55, 56, 57, 58 Slot 6: 61, 62, 63, 64, 65, 66, 67, 68	1–FFE
	Note: The Centillion 50 switch contains only slots 1 through 3.	
Priority (Valid only when source route bridging is selected.)	128	0–255
Path cost (Valid only when source route bridging is selected.)	16	1–65535
ARE hop count (Valid only when source route bridging is selected.)	7	1–7 or 1–13
STE hop count (Valid only when source route bridging is selected.)	7	1–7 or 1–13
SR broadcasting (Valid only when source route bridging is selected.)	Auto	Auto, Off, On

If the factory default settings are not appropriate for your network, you may be able to use one of the predefined switch configurations that are available in SpeedView. You simply choose one of these without having to configure individual ports.

Predefined configurations are available for the following applications:

- All transparent switching with no spanning tree support
- All transparent bridging with IEEE 802.1d spanning tree support
- All source route bridging between token rings (see Table 3-3 for default ring numbers) with IBM spanning tree support

You must enter additional configuration information if you are using any of the following features:

- Virtual rings
- Filtering
- Source routing ring numbers that are different than the default values
- Combinations of bridging modes and spanning tree not offered as defaults

For instructions for using these features, refer to *Using SpeedView 2.1 for Windows*.

Removing and Replacing a Module

A TokenSpeed module can be hot inserted in a chassis at any time, but a TokenSpeed/MCP module should not be removed from a functioning switch. Installing a TokenSpeed/MCP module resets the switch and loads the default configuration, thus interrupting network connectivity.

If you are adding a module to an empty slot in an already functioning switch, follow the instructions that begin on page 3-2. If you are replacing an installed module, follow the instructions in the next two sections.

To remove or replace a TokenSpeed or TokenSpeed/MCP module, you need a medium-size flat-tip screwdriver to loosen and tighten the retaining screws on the module.

If you suspect that a TokenSpeed module is malfunctioning, see Chapter 4, "Troubleshooting the TokenSpeed Module," before you replace the module.

Note: To minimize configuration conflicts, you should replace a module with another identical module. If the new module is not identical to the module previously in that slot, the new module remains inoperative until it is reconfigured using SpeedView.

Replacing a TokenSpeed/MCP Module

Caution: You should not hot swap a TokenSpeed/MCP module.

To replace a TokenSpeed/MCP module in a chassis, follow these steps:

1. **Notify network users that the network will be out of service, and advise them to save all work and log out of active sessions.**
2. **Save the current configuration in a file on your SpeedView management station.**

   For instructions on saving configuration files, refer to *Using SpeedView 2.1 for Windows*.

   If you have an extra Centillion switch chassis, you can minimize network disruption by loading the saved configuration on the new TokenSpeed/MCP module using the additional chassis; then replace the old module.
3. **Turn off the power to the switch.**
4. **Loosen the two retaining screws on the module until they pop free of the switch chassis frame (see Figure 3-9).**
5. **Rotate the left and right inserter/extractor levers away from the center of the module to loosen the module from the backplane connectors (see Figure 3-9).**

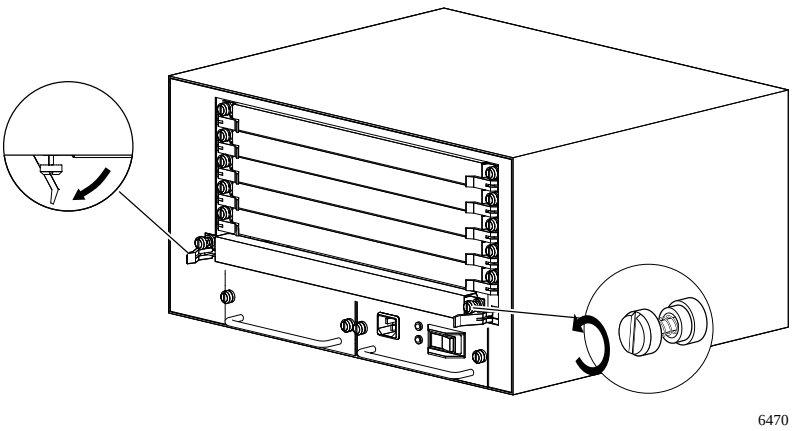


Figure 3-9. Loosening the TokenSpeed module

6. **Slide the module out of the chassis (see Figure 3-10).**

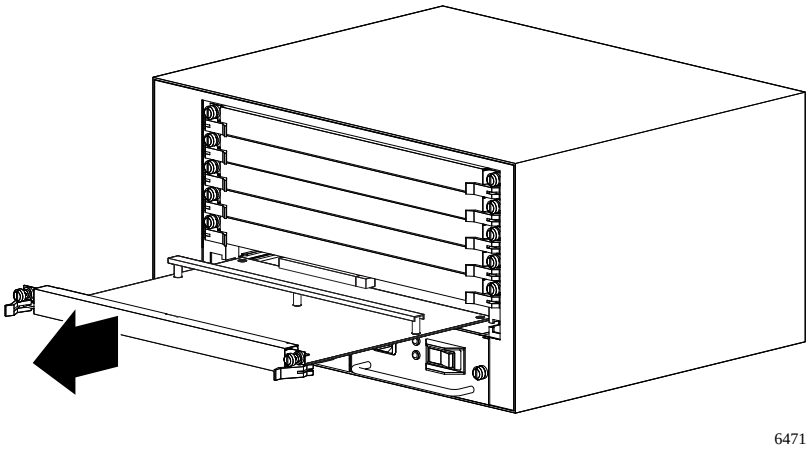


Figure 3-10. Removing the module from the switch chassis

7. **If you will not be replacing the module soon, attach a filler panel over the empty slot. Otherwise, continue with step 8.**
8. **Install the new module, following the instructions in "Installing the TokenSpeed Module" on page 3-2.**
9. **Turn on the power to the switch.**
10. **Download the saved configuration file to the new module.**

    For module configuration instructions and for instructions on saving and downloading files, refer to *Using SpeedView 2.1 for Windows*.

Replacing a TokenSpeed Module

You do not need to turn off the switch power before you replace a TokenSpeed module that does not have an MCP.

To replace a TokenSpeed module, follow these steps:

1. **Disable all ports on the module using SpeedView, or disconnect the cables from each port.**

   Disabling the ports on a module is described in *Using SpeedView 2.1 for Windows*.

2. **Wait 45 seconds.**

   Waiting allows the system software to process the requests to disable the ports.

Caution: If you remove a module without waiting 45 seconds after disabling the ports, you must power cycle the Centillion switch chassis. When you turn off the power on the Centillion switch chassis, you must wait 15 to 20 seconds before turning the power back on. The TokenSpeed modules begin switching an additional 15 to 20 seconds after power is resumed.

3. **Loosen the two retaining screws on the module until they pop free of the chassis frame (see Figure 3-11).**

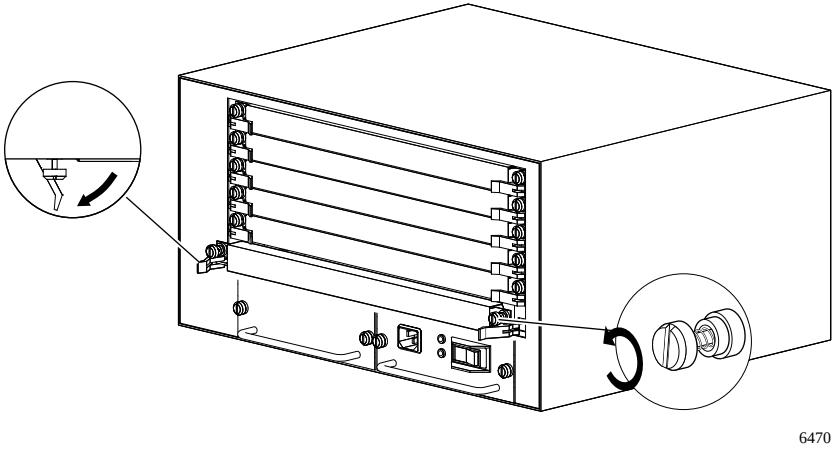


Figure 3-11. Loosening the TokenSpeed module

4. **Rotate the left and right inserter/extractor levers away from the center of the module to loosen the module from the backplane connectors (see Figure 3-11).**
5. **Slide the module out of the chassis (see Figure 3-12).**

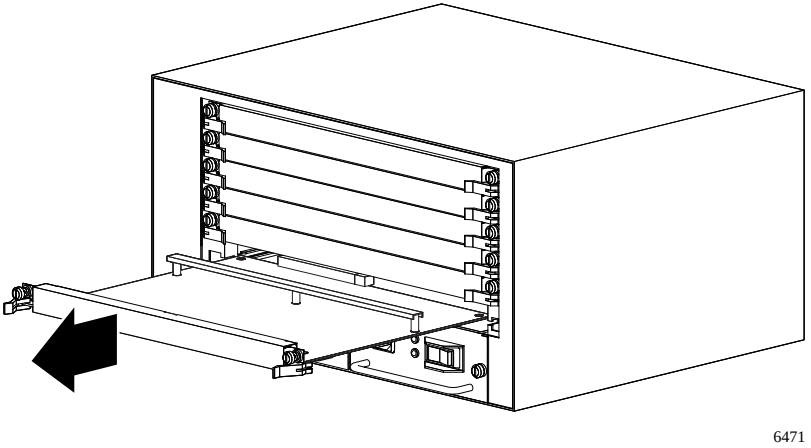


Figure 3-12. Removing the module from the Centillion chassis

6. **If you will not be replacing the module soon, attach a filler panel over the empty slot. Otherwise, continue with step 7.**
7. **Install the new module, following the instructions in "Installing the TokenSpeed Module" on page 3-2.**

Chapter 4
Troubleshooting the TokenSpeed Module

This chapter provides suggestions for troubleshooting the TokenSpeed module.

This chapter covers the following topics:

- Switch startup failure (see page 4-2)
- Module startup failure (see page 4-3)
- Port insertion problems (see page 4-4)

To expedite support when you call Bay Networks, please have the following information ready:

- Hardware configuration
- Software configuration (including the image file version number and SpeedView version number)
- Network diagram
- Module or switch part number and serial number for the suspected unit
- Brief description of the problem

Switch Startup Failure with TokenSpeed/MCP

Symptom: The startup process halts, and the module LEDs remain lit.

If the code image stored in flash memory becomes corrupted, the checksum fails during reset. You must perform an emergency image download.

To load and start the switch with the switch image provided on the Centillion Switch Images diskette, follow these steps:

1. **Locate the Centillion Switch Images diskette that was shipped with your SpeedView software.**
2. **Connect a SpeedView station to the serial port of the TokenSpeed/MCP module, using either the direct connection or the modem connection.**

   This procedure is described in *Using SpeedView 2.1 for Windows*.
3. **Verify through the command line interface (CLI) that the switch is unable to start.**

   a. **Close SpeedView and run a terminal emulation program to access the CLI.**

      For more information, refer to *Reference Guide for the Centillion Command Line Interface.*

   b. **If the switch is unable to start, the screen does not display the CLI prompt. Instead, the following message is displayed:**

      ```
      Is there anyone out there?
      ```
4. **Quit the terminal emulation program and start SpeedView.**
5. **Verify that the serial port is selected in the Preferences dialog box.**
6. **Select the Map menu, and then choose Discover.**

   The discovery process completes in a few seconds. A map window with no icons is displayed.
7. **Select the Switch menu, and then choose Download Software.**
8. **Select the switch image file, and then click on Open.**

   The Software Download dialog box is displayed. For detailed information about this dialog box and the software download procedure, refer to *Using SpeedView 2.1 for Windows*.

9. **Click on the Start button in the Software Download dialog box.**

   If the display returns to the Main Menu instead of displaying the "Writing to Flash" message, the download process did not complete successfully.

10. **If you are not prompted to reset the switch, choose Discover again.**

11. **Click on the icon for the switch and choose Download software.**

    When the download is complete, the following message is displayed:

    ```
    Writing to Flash...
    ```

    The switch begins executing the loaded switch image and prompts you to reset the switch.

12. **Choose Reset to verify that the downloaded image is installed properly.**

When the switch completes the reset and starts operating properly, you may continue normal operation. If the reset is unsuccessful or an error indication appears, repeat the entire procedure. If it fails again, call Bay Networks customer support. Please be ready to provide the service representative with the information listed on page 4-1.

TokenSpeed Module Startup Failure

Symptom: The switch startup process completes successfully, but the Activity LED blinks continually.

To resolve the problem, follow these steps:

1. **Check all modules in the chassis to make sure they are firmly seated and that the retaining screws are tight.**

2. **Remove and reinsert the failing module.**

If the problem persists, contact Bay Networks customer support. Please be ready to provide the service representative with the information listed on page 4-1.

Port Insertion Problems

Symptom: The Act LED on a token ring port does not flash for a period of 15 to 20 seconds.

No flashing on the Act LED on a token ring port typically indicates port insertion problems.

To resolve the problem, follow these steps:

1. **Verify that the port is not operational by accessing the SpeedView multicast frame transmit and receive count statistics (Mcst xmit and Mcst rcv). Verify that the statistics are updating regularly over a period of 15 to 20 seconds.**

   If the counts change, the token ring port is inserted and operating. If the port is operating but the Activity LED stays dark, the LED may be damaged.

   If the counts do not change, the token ring port is not inserted or enabled. Proceed to the following steps to verify proper installation, configuration, and connection for the port.

2. **Verify that the cabling is correct.**

   See Appendix B, "Cables," for information about the token ring port types and pin assignments for different connectors.

3. **Using SpeedView, verify the following items:**

   - The appropriate port type is configured: Station, Hub, Bay/SNPX RO, RI–other, or RO–other.

     For more information about setting port types, see "Token Ring Connections" on page 3-6.

   - The port is enabled.

- Port speed and speed sensing are configured appropriately.
  - If the port speed is not set to Auto, and Speed Sense is disabled, the port is forced to operate at a particular speed. Verify that the configured speed matches the actual speed of the ring.
  - If Speed Sense is enabled, be sure that at least one device on the connected ring is not set to Speed Sense.
  - If the switch is connected to an intelligent hub that has automatic speed sensing, such as a Bay Networks hub, configure a specific speed for the port on the TokenSpeed module and disable the Speed Sense option.
- The ring number assigned to this port does not conflict with other ring numbers in the network.

  If the ring parameter server tells the port a different ring number from the number that is configured, the port will deinsert.

4. **Disable the port; then enable it again.**
5. **If the port still fails to insert, try inserting the port into another ring segment.**

   If the second port inserts successfully, check the status of the first ring.

   If the second port fails to insert into the other ring, contact Bay Networks customer support. Please be ready to provide the service representative with the information listed on page 4-1.

Appendix A
Technical Specifications

This appendix provides technical specifications for the TokenSpeed module.

Data Rate

4 Mb/s or 16 Mb/s, IEEE 802.5

Microprocessors

Baseboard:64-bit MIPS 4000 series processor, 100 MHz (MIPS)

Memory

Processor	2 MB (TokenSpeed module) 10 MB (TokenSpeed/MCP module)
Buffer pool	1 MB
Flash	128 KB (TokenSpeed module) 2.5 MB (TokenSpeed/MCP module)

Electrical Specifications

Power consumption:	45 W maximum
Thermal rating	155 BTU/hr maximum

Physical Specifications

Dimensions	(L) 10.5 by (W) 12.5 by (H) 1.0 in. (L) 26.7 by (W) 31.7 by (H) 2.5 cm
Weight	3.0 lb (1.36 kg) (TokenSpeed module) 3.1 lb (1.41 kg) (TokenSpeed/MCP module)

Environmental Specifications

Operating temperature	0° to 40° C
Storage temperature	–25° to 70° C
Operating humidity	85% maximum relative humidity, noncondensing
Storage humidity	95% maximum relative humidity, noncondensing
Operating altitude	10,000 ft (3,000 m) maximum
Storage altitude	10,000 ft (3,000 m) maximum
Free fall/drop	ISO 4180-s, NSTA 1A
Vibration	IEC 68-2-6/34
Shock/bump	IEC 68-2-27-29

Electromagnetic Emissions

Meets requirements of:

FCC Part 15, Subpart B, Class A

EN 55 022 (CISPR 22:1985), Class A

VCCI Class 1 ITE

Electromagnetic Susceptibility

Electrostatic discharge (ESD)	EC 801-2, Level 2
Radiated electromagnetic field	EC 801-2, Level 2
Electrical fast transient/burst	EC 801-4, Level 2
Electrical surge	IEC 801-5, Level 1/2

Safety Agency Approvals

UL/CUL listed (UL 1950)

CSA certified (CSA 22.2 #950)

TUV licensed (EN 60 950)

UL-94-V1 flammability requirements for all PC boards

Connectors

RJ-45 connectors for UTP/STP interface

Mini DIN 8 serial connector for network administration (TokenSpeed/MCP only)

Appendix B
Cables

This appendix provides cable wiring information for TokenSpeed module port connections. When you connect network devices to the TokenSpeed module, you must specify the port type through SpeedView and use a straight-through cable with an RJ-45 connector for the connection to the module port. The requirements for the far-end connector vary according to the type of device you are connecting.

This appendix includes information about the following topics:

- Port type settings for the token ring ports (see page B-2)
- Cable types for connecting token ring network devices to the TokenSpeed module (see page B-2)
- Pin locations for the RJ-45 connectors on the TokenSpeed module (see page B-3)
- Pin assignments for cables used to connect token ring network devices (see page B-4)
- Connector pin assignments for the male Mini DIN 8 to male DB-25 cable and female DB-25 to female DB-9 adapter for serial MCP connections (see page B-13)

Port Types

When you connect a network device to a token ring port on the TokenSpeed module, you must specify a TokenSpeed port type through SpeedView. The port type setting is based on the type of network connection you are connecting to the TokenSpeed module. Table B-1 shows the types of network connections and the correct port type for each.

Table B-1. Port types for the TokenSpeed module

Network device port	TokenSpeed port type
Lobe port on token ring hub	Station
Lobe port on IBM 8228 MAU or similar device	Station
Station port on a network interface card (NIC) in a server, PC, or router	Hub
RI port on a Bay Networks token ring hub	Bay/SNPX RO
RO port on a Bay Networks token ring hub	RI–other **Note:** The RO port type on the Bay Networks hub must be set as Other.
RI port on a non-Bay Networks token ring hub	RO–other
RO port on a non-Bay Networks token ring hub	RI–other

Cable Types

The following types of cables are used to make connections to the TokenSpeed module:

- Category 3, 4, or 5 UTP cable with an RJ-45 connector on one end and an appropriate connector on the other end for the device you are connecting to the TokenSpeed module
- Type 1A STP cable with an RJ-45 connector on one end and an appropriate connector on the other end for the device you are connecting to the TokenSpeed module
- Serial MCP cable that is shipped with the Centillion switch

Table B-2 shows maximum distances for cables used in a token ring network that includes the TokenSpeed module.

Table B-2. Cable distances

Cable type	4 Mb/s	16 Mb/s
UTP cable type		
Category 3 DIW	200 m	100 m
Category 4	375 m	150 m
Category 5	400 m	200 m
STP cable type		
1, 1A, 2	900 m	450 m
6, 9	600 m	300 m
8	400 m	200 m

Note: These distances are accurate only for connection to and from active hubs and stations. For connections to a passive device, refer to the documentation that was shipped with that product.

Token Ring Connectors on the TokenSpeed Module

The token ring ports on the TokenSpeed module have RJ-45 sockets with the pin numbers and locations shown in Figure B-1. This connector is equivalent to the typical connector on a network adapter that is used in a station device or network node.

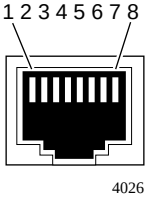


Figure B-1. RJ-45 connector on the TokenSpeed module

Cable and Connector Pin Assignments

This section provides the pin assignments for connectors typically used to connect network devices to the TokenSpeed module. For each connection type, the illustrations show the TokenSpeed port type, pin numbers, signal, and phantom source. All cables are shown as straight-through cables because the correct port type setting on the TokenSpeed module automatically adjusts the port for any needed crossover function.

The end that connects to the TokenSpeed module is an RJ-45 connector. The connector at the other end can be another RJ-45 connector, a DB-9 connector, or an IBM Type 1 connector (see Figure B-2).

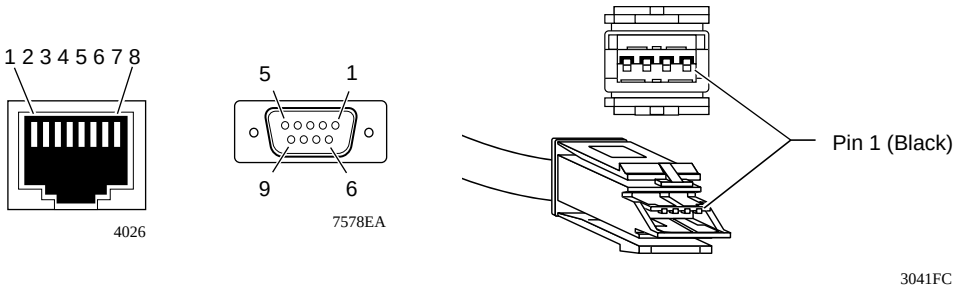


Figure B-2. Connectors for token ring network cables

RJ-45 to RJ-45 Connection

The figures in this section show cable wiring for the following types of RJ-45 to RJ-45 connection:

- TokenSpeed Hub port type connected to a station port in a network adapter card (see Figure B-3)
- TokenSpeed Station port type connected to a lobe port on a token ring hub, such as a Bay Networks Model 2715 token ring hub or an IBM 8228-style device (see Figure B-4)
- TokenSpeed Bay/SNPX RO port type connected to an RI port on a Bay Networks hub (see Figure B-5)
- TokenSpeed RI–other port type connected to an RO port (see Figure B-6)
- TokenSpeed RO–other port type connected to an RI port (see Figure B-7)

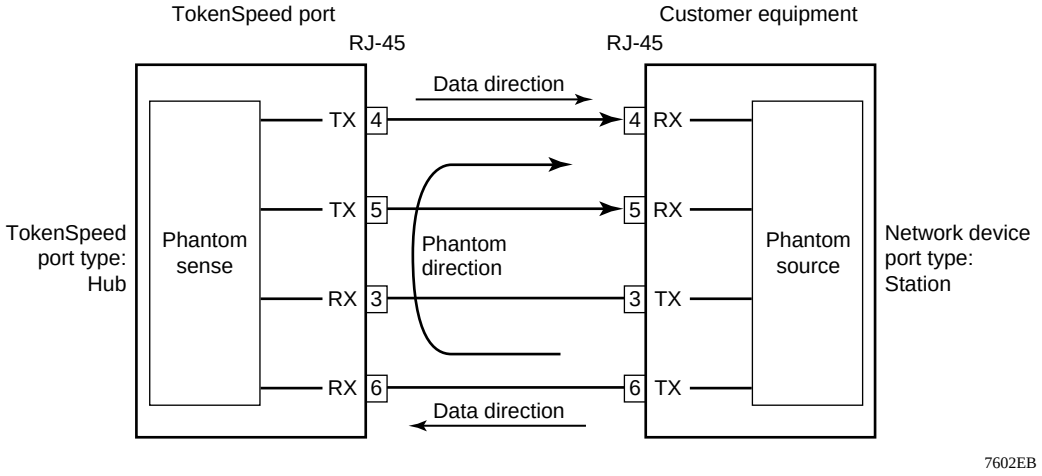


Figure B-3. Hub to station connection (RJ-45 to RJ-45)

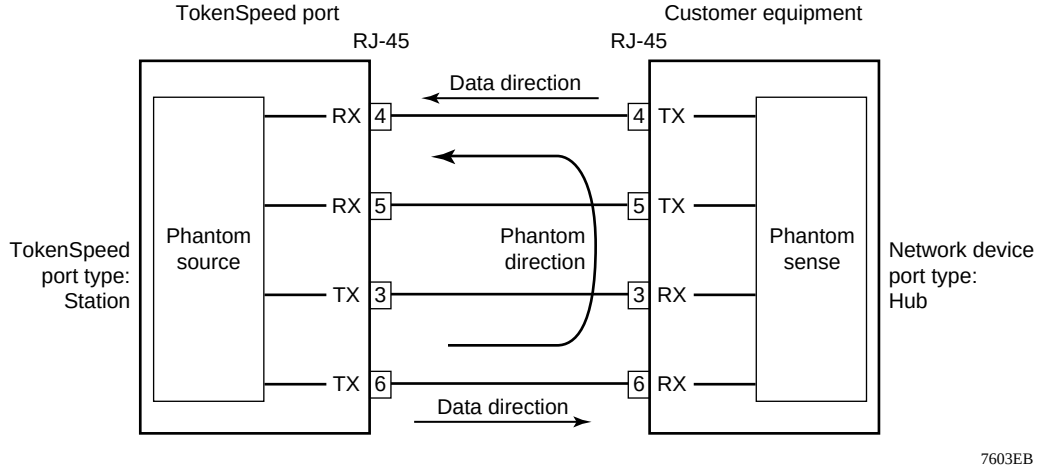


Figure B-4. Station to hub connection (RJ-45 to RJ-45)

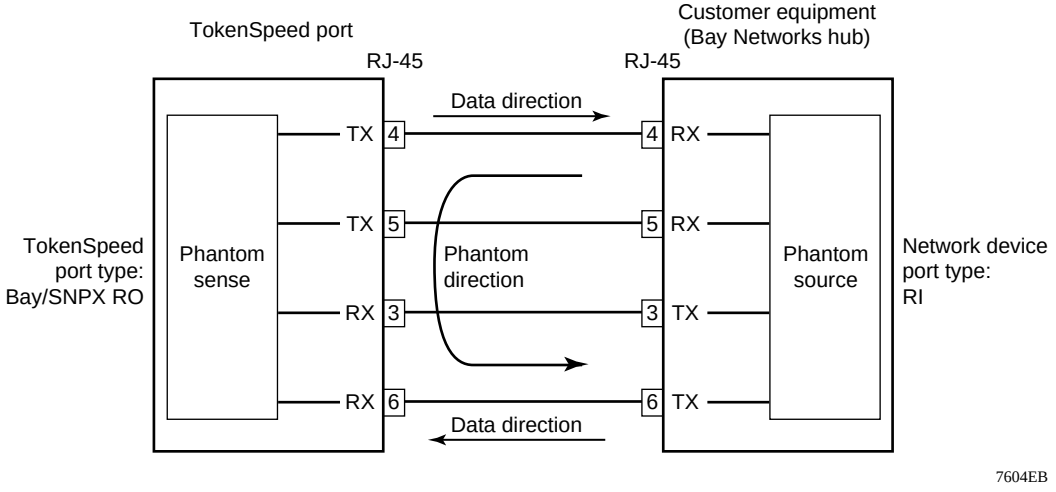


Figure B-5. Bay/SNPX RO to RI connection (RJ-45 to RJ-45)

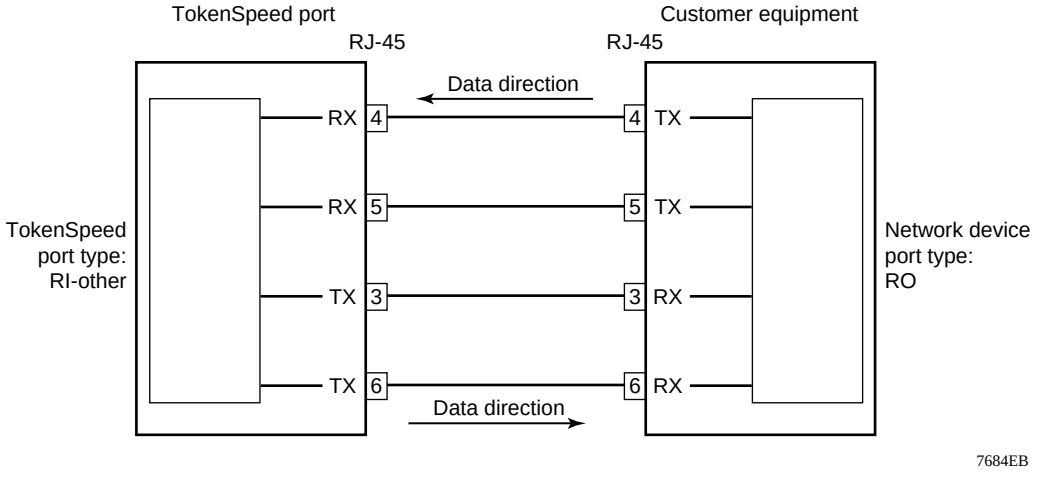


Figure B-6. RI–other to RO connection (RJ-45 to RJ-45)

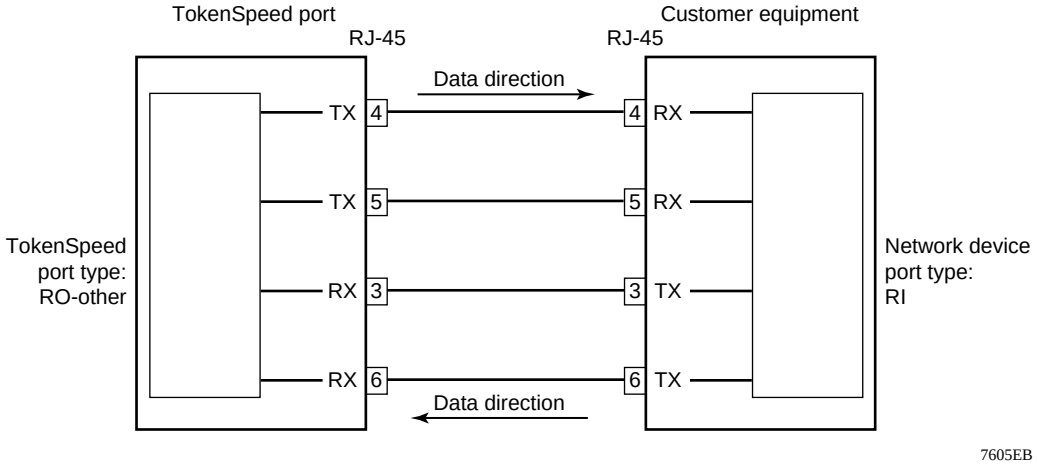


Figure B-7. RO–other to RI connection (RJ-45 to RJ-45)

RJ-45 to DB-9 Connection

The figures in this section show cable wiring for the following types of RJ-45 to DB-9 connection:

- TokenSpeed Hub port type connected to a station port in a network adapter card (see Figure B-8)
- TokenSpeed Station port type connected to a lobe port on a token ring hub, such as a Bay Networks Model 2715 token ring hub or an IBM 8228-style device (see Figure B-9)
- TokenSpeed Bay/SNPX RO port type connected to an RI port on a Bay Networks hub (see Figure B-10)
- TokenSpeed RI–other port type connected to an RO port (see Figure B-11)
- TokenSpeed RO–other port type connected to an RI port (see Figure B-12)

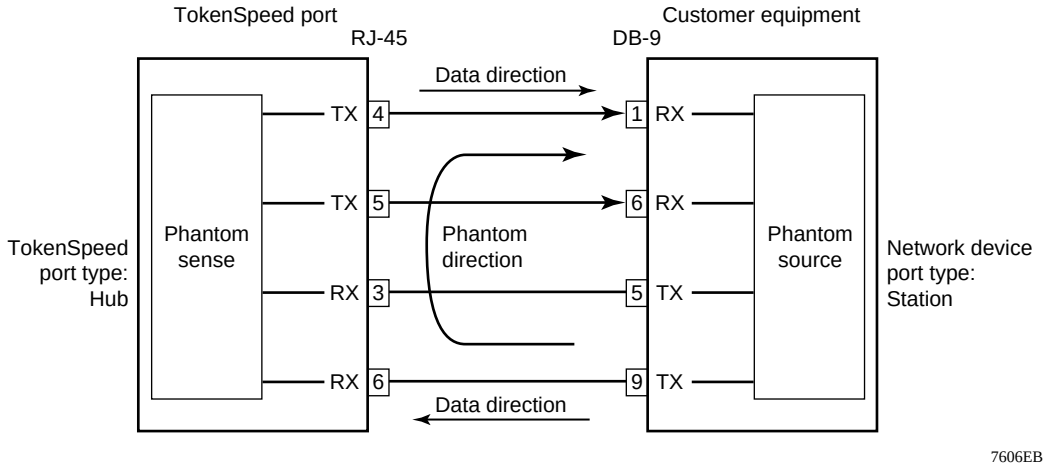


Figure B-8. Hub to station connection (RJ-45 to DB-9)

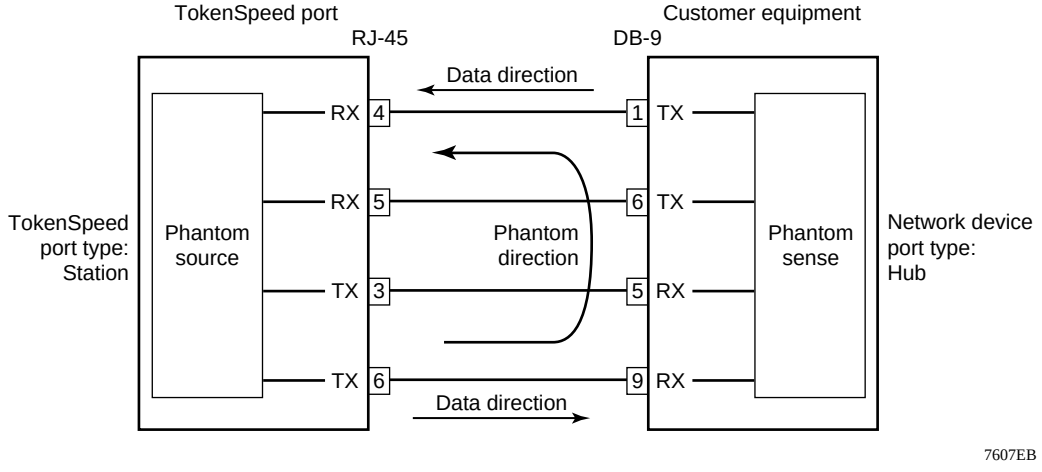


Figure B-9. Station to hub connection (RJ-45 to DB-9)

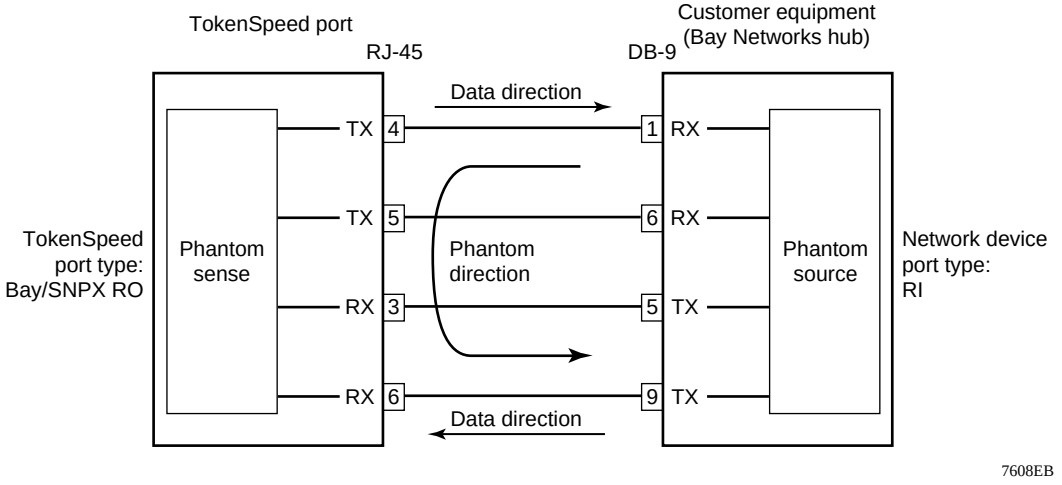


Figure B-10. Bay/SNPX RO to RI connection (RJ-45 to DB-9)

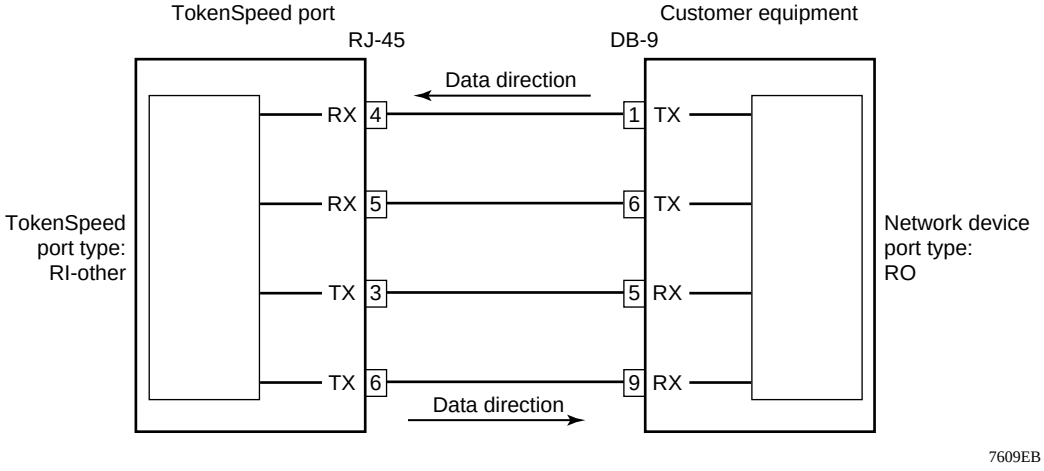


Figure B-11. RI–other to RO connection (RJ-45 to DB-9)

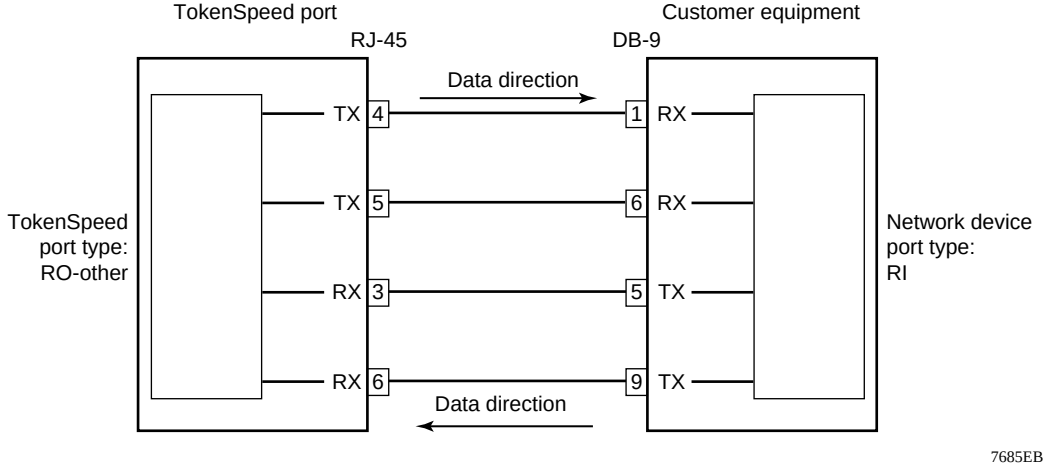


Figure B-12. RO–other to RI connection (RJ-45 to DB-9)

RJ-45 to IBM Type 1 Connection

The figures in this section show cable wiring for the following types of RJ-45 to IBM Type 1 connection:

- TokenSpeed Station port type connected to a lobe port on a token ring hub, such as a Bay Networks Model 2715 token ring hub or an IBM 8228-style device (see Figure B-13)
- TokenSpeed Bay/SNPX RO port type connected to an RI port on a Bay Networks hub (see Figure B-14)
- TokenSpeed RI–other port type connected to an RO port (see Figure B-15)
- TokenSpeed RO–other port type connected to an RI port (see Figure B-16)

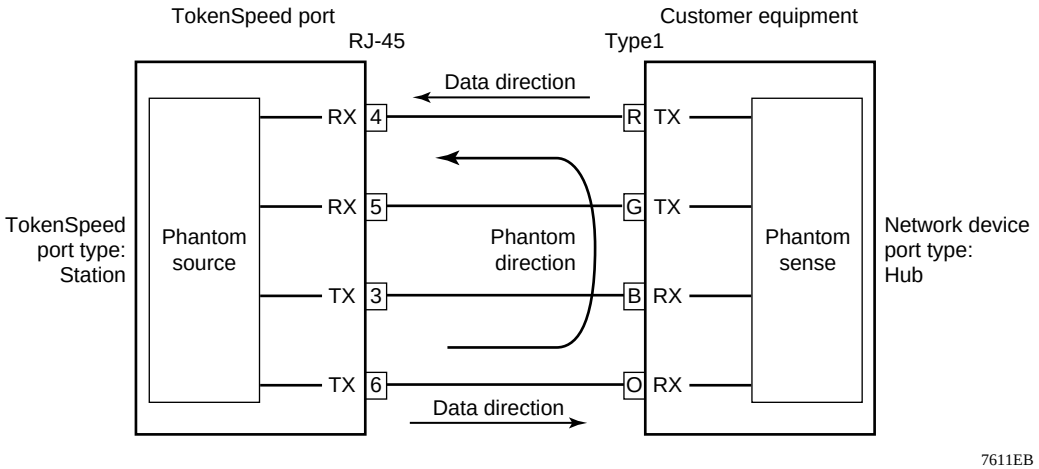


Figure B-13. Station to hub connection (RJ-45 to IBM Type 1)

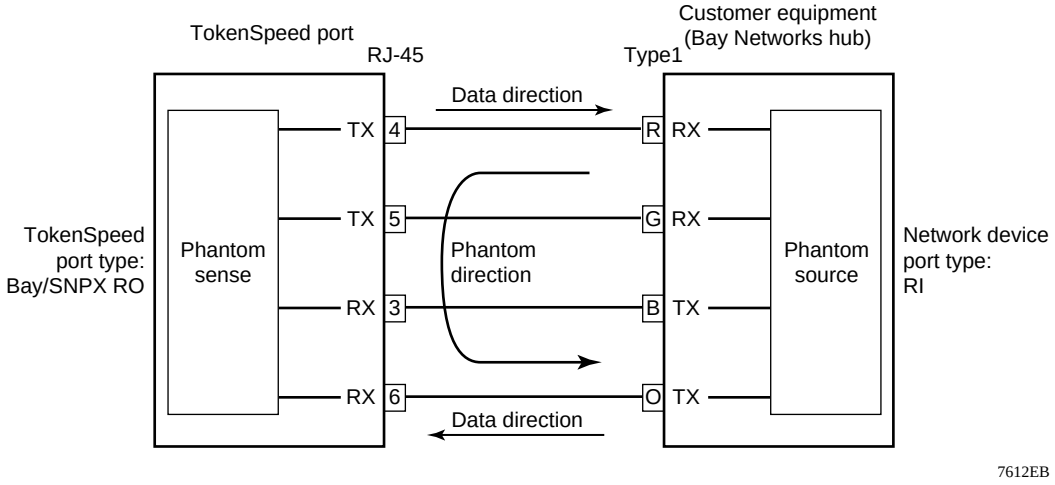


Figure B-14. Bay/SNPX RO to RI connection (RJ-45 to IBM Type 1)

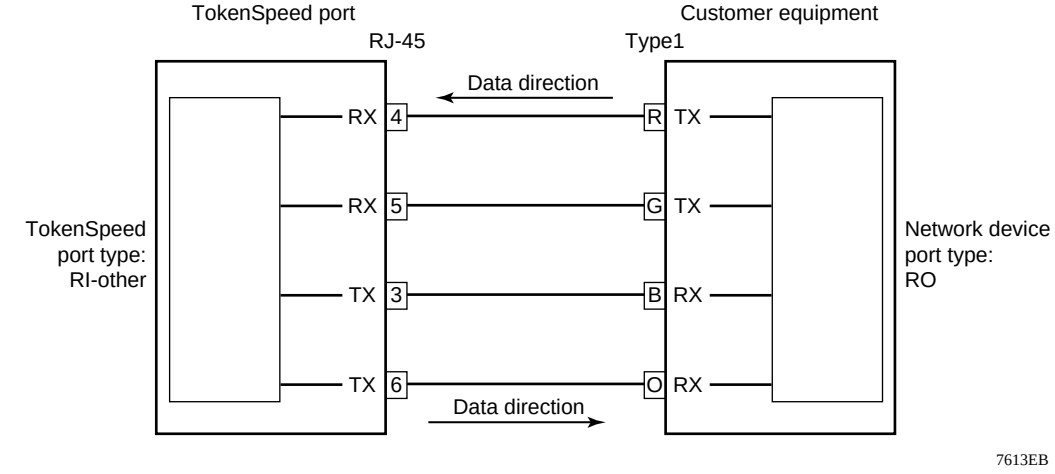


Figure B-15. RI–other to RO connection (RJ-45 to IBM Type 1)

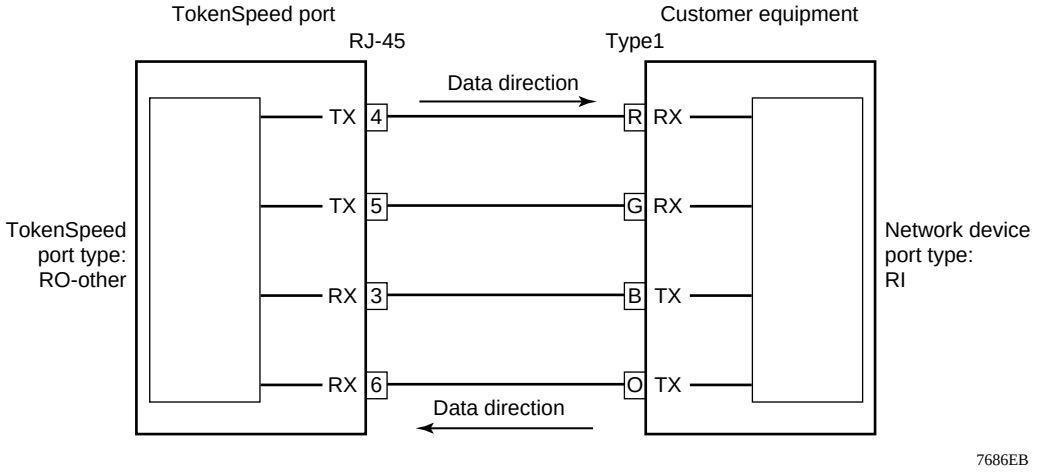


Figure B-16. RO–other to RI connection (RJ-45 to IBM Type 1)

Serial MCP Connections

The Centillion chassis package includes a male Mini DIN 8 to male DB-25 cable and a female DB-25 to female DB-9 adapter for serial MCP connections. This section describes these components.

Table B-3 shows the connections for a male Mini DIN 8 to male DB-25 cable.

Table B-3. Male Mini DIN 8 to male DB-25 cable

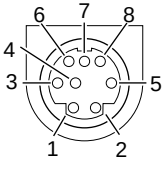
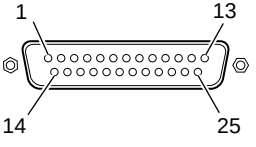
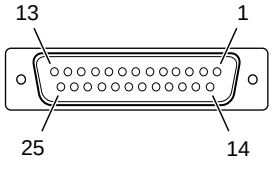
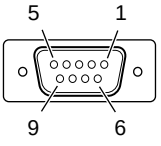
Male Mini DIN 8 pin locations	Male Mini DIN 8 pin numbers	Signal	Male DB-25 pin numbers	Male DB-25 pin locations
	1	Reserved		
	2	Data terminal ready	20	
	3	Transmit data	3	
	4	Signal ground	7	
	5	Receive data	2	
	6	Reserved		
	7—Not connected			
	8	Reserved		

Table B-4 shows the connections for a female DB-25 to female DB-9 adapter.

Table B-4. Female DB-25 to female DB-9 adapter

Female DB-25 pin locations	Female DB-25 pin numbers	Signal	Female DB-9 pin numbers	Female DB-9 pin locations
 7579EA	8	Data carrier detect	1	 7578EA
	3	Receive data	2	
	2	Transmit data	3	
	20	Data terminal ready	4	
	7	Signal ground	5	
	6	Data set ready	6	
	4	Request to send	7	
	5	Clear to send	8	
	22	Ring indicator	9	

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